

INTRODUCTION TO TYMPANOMETRY



Definition:

- Tympanometry is an electronic and acoustic measurement technique to assess middle ear status
- Combined with otoscopy, it is an objective, fast, and highly accurate way to rule out outer and middle ear pathology



Purpose:

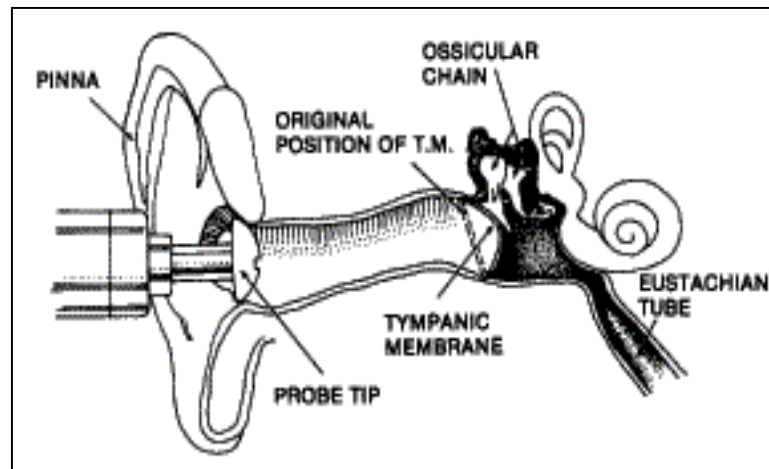


- **Identifies patients requiring medical referral**
- **Separates probable noise-induced etiologies from those due to other causes**
- **Tracks the progress of middle ear pathologies that are under medical treatment**

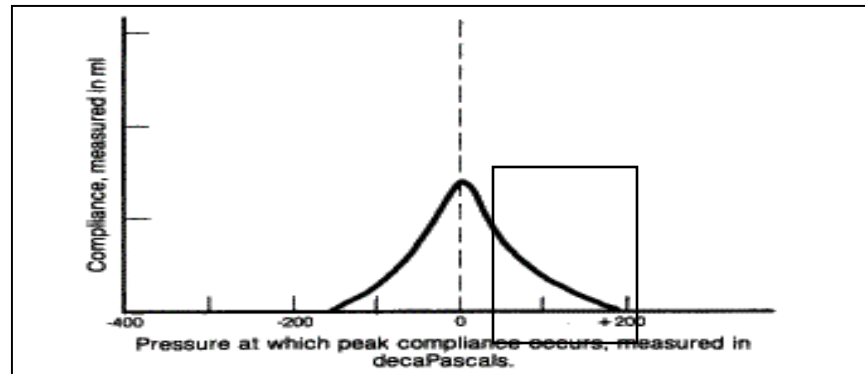
Principles of Tympanometry

Introduces a pure tone into ear canal through 3-function probe tip

- **Manometer (pump) varies air pressure against TM (controls mobility)**
- **Speaker introduces 220Hz probe tone**
- **Microphone measures loudness in ear canal**

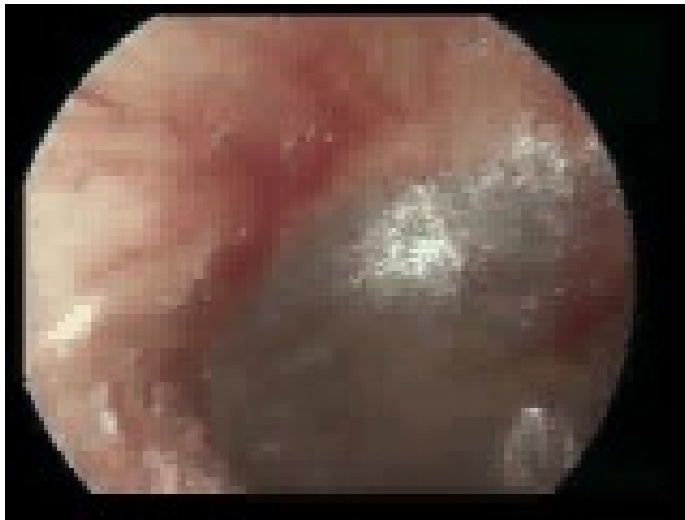


TYMPANOMETRY



- A Tympanogram is a graphic picture of the middle ear function that results as the pressure is varied against the TM
- Tympanogram's may be divided into 3 basic types and 2 sub-types, according to the shape of the graph that is obtained

Here's how it works...

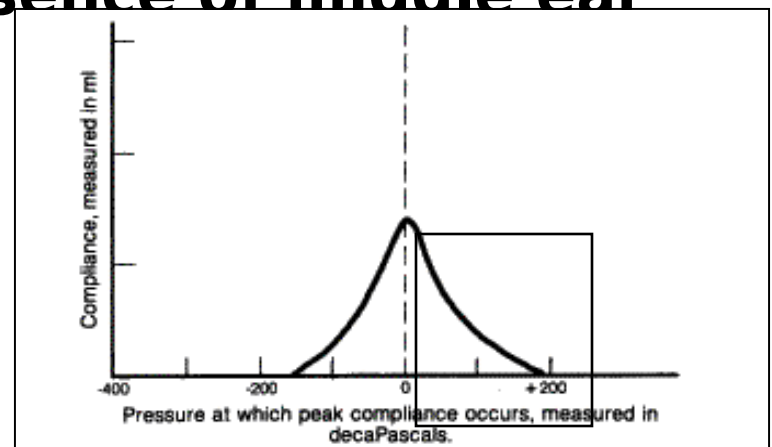


Click on the picture....

Characteristics of the Different Types of Tympanograms

Type A - Normal Tympanogram

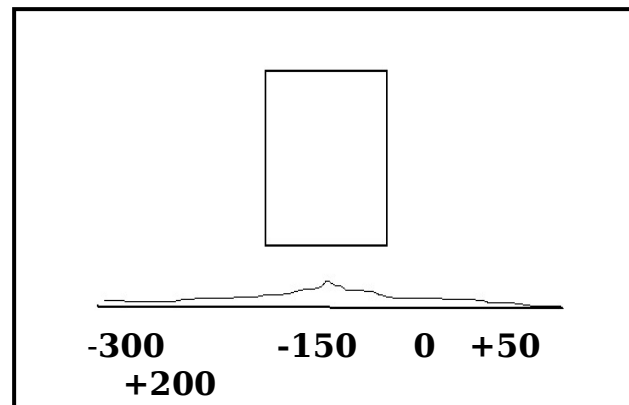
- The peak of the pressure curve falls between +50 and -150 millimeters of pressure
- Peak compliance falls between .2 and 1.8 mm
- Results indicate the absence of middle ear pathology
 - Intact & mobile TM with normal eustachian tube function
 - If there is a hearing loss, it is likely to be sensori-neural!



Characteristics of the Different Types of Tympanograms

Type As (shallow): Abnormal Tympanogram

- The peak of the pressure curve falls between +50 and -150 millimeters of pressure (WNL)
- Peak compliance very low (well below .2 mm)
- Often associated with ossicular fixation or TM scarring (not middle ear effusion)
- May result in a fairly flat, non-fluctuating hearing loss
- Eustachian tube function is normal

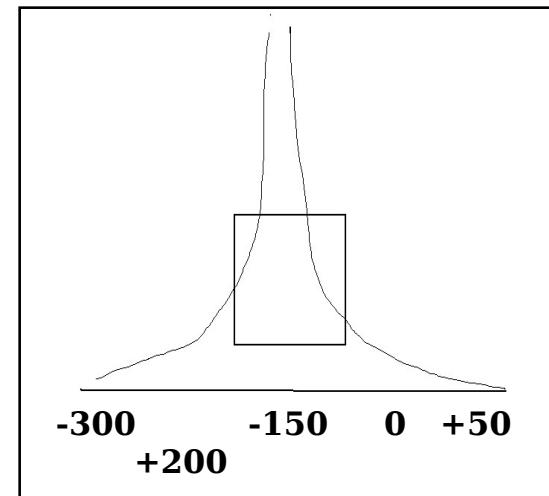


Characteristics of the Different Types of Tympanograms

Type Ad (disarticulation): Abnormal Tympanogram

- The peak of the pressure curve falls between +50 and -150 millimeters of pressure (WNL)
- Peak compliance very high or off chart
- Associated with ossicular disarticulation
- May result in a fairly flat,
- Eustachian tube function

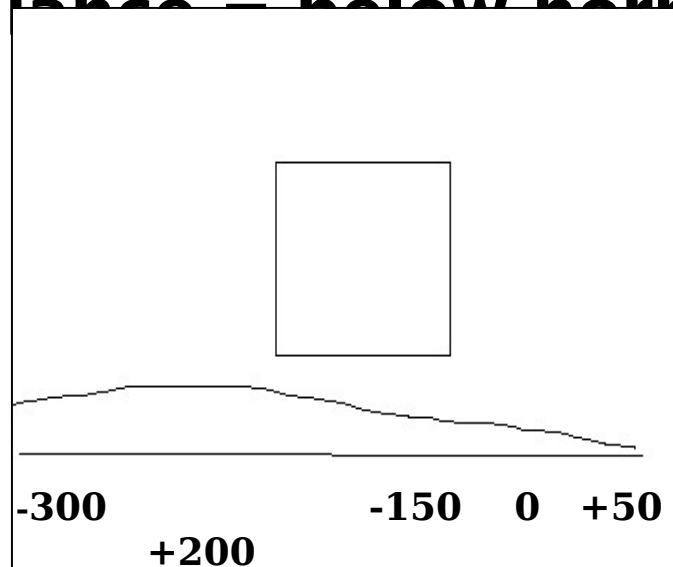
non-fluctuating hearing loss
is normal



Characteristics of the Different Types of Tympanograms

Type B: TM Retracted, Poorly Mobile

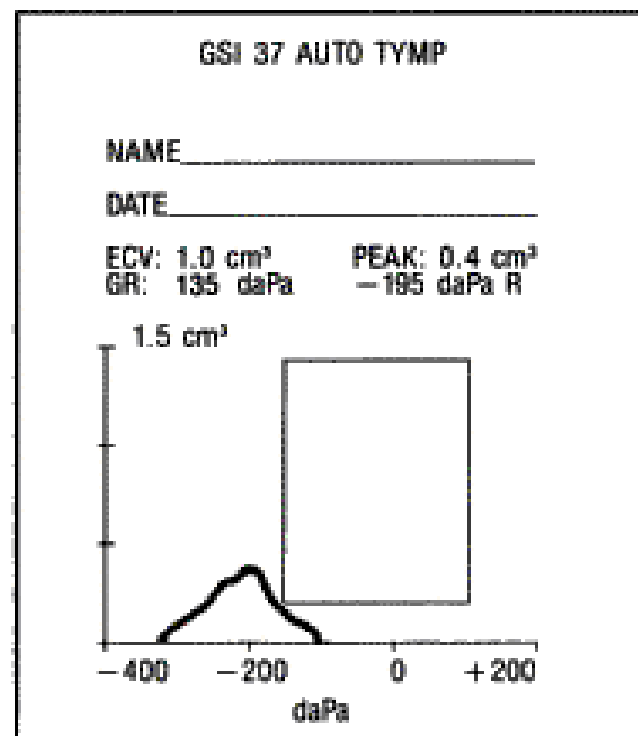
- Peak is absent/poorly defined and at markedly negative middle ear pressure (>-200 mm)
- Max compliance = below normal range

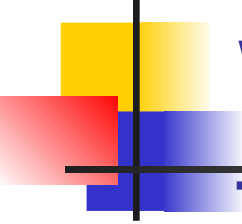


Characteristics of the Different Types of Tympanograms

Type C:

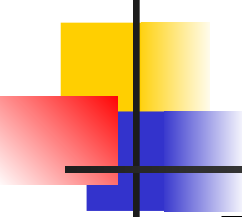
- There is a clearly defined peak, but it falls on the negative side of the chart, indicating negative middle ear pressure
- Peak pressure is seen at greater than -150 mm (moved to left)
- Peak compliance may be normal
- Diagnosis: Eustachian tube dysfunction, may cause a very mild conductive loss, or hearing can be WNL





Disposition for patients with abnormal tympanograms

- Medical referral is generally indicated for abnormal tympanometry findings
- If possible, continue to track the patient until the middle ear pathology is resolved
- During tx for OM/effusion, T-grams usually progress from Type B, to Type C, to Type A over a 10-14 day period

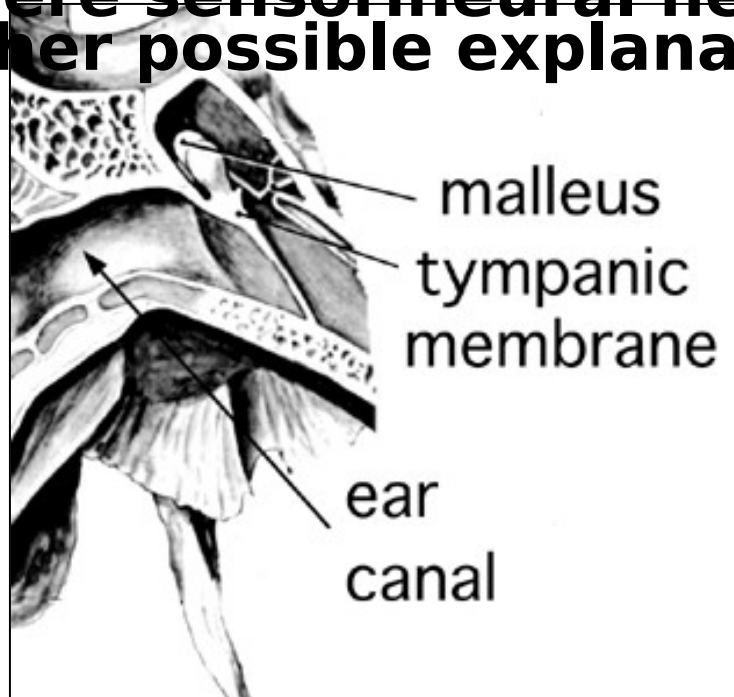


Acoustic Reflex Testing

- The stapedius muscle attaches to the footplate of the stapes
- Upon being triggered by loud sound, contraction of the stapedius dampens motion of the stapes, reducing effectiveness of the ossicular chain
- In acoustic reflex testing, the probe tip produces a sudden loud tone and simultaneously records any drop in compliance
- If the compliance drops, the tympanometer records the acoustic reflex as present
 - Interpret as no conductive component, and not more than moderately severe hearing loss
- If compliance is not affected, the tympanometer records the reflex as absent
 - Subject to wide range of interpretation

Interpreting results of acoustic reflex testing: Summary

- Reflex present = probable normal middle ear function
- Reflex absent = possible middle ear problem, severe sensorineural hearing loss, or several other possible explanations



Technician Limitations of Interpretation



- Tympanograms, acoustic reflex testing, otoscopy, patient complaints, and audiograms should be considered collectively before a referral decision is made
- Technicians should not draw diagnostic conclusions or interpret test results without supervision

QUESTIONS?

Practice administering tympanograms

